

largest; the equatorial diameter the next; and the polar diameter the smallest.

June 1.—Two measures of the latitude of the greatest curvature were taken, by setting the fixed thread of the micrometer to the direction of the ring. The mean of these was $43^{\circ} 20'$.

June 2nd.—The two planets were viewed alternately, with powers of 300, of 200, and of 160; and even with the lowest of these, the difference in the figure of the planets was very evident.

The telescopic appearance of Saturn was then compared with a figure drawn from the measures Dr. Herschel had taken, combined with the proportion between the equatorial and polar diameters determined in the year 1789. From these a corrected figure was formed, of which an exact copy is given. The dimensions of it, in proportional parts, are,—

Diameter of the greatest curvature	36
Equatorial diameter	35
Polar diameter	32
Latitude of the longest diameter	$43^{\circ} 20'$

These observations, Dr. Herschel thinks, may tend, in some measure, to ascertain the quantity of matter in the ring and its solidity; they also afford a new instance of the effect of gravitation on the figure of planets; for in the present case the opposite influence of two centripetal, and two centrifugal forces, must be considered.

On the magnetic Attraction of Oxides of Iron. By Timothy Lane, Esq. F.R.S. Read June 20, 1805. [*Phil. Trans.* 1805, p. 281.]

Mr. Lane having observed that hardened iron is not so readily attracted by the magnet as soft iron, was proceeding to make some experiments on the subject, when he was led, by Mr. Hatchett's paper on Magnetical Pyrites, &c., to examine what magnetical properties iron possessed when free from inflammable matter. For this purpose he procured some of the precipitate sold at Apothecaries' Hall under the name of *Ferrum precipitatum*, and which is prepared by adding purified kali to a solution of sulphate of iron. This precipitate, the author says, has no magnetic particles; nor, when exposed to a clear red heat, does it acquire any, except when smoke or flame have access to it. The solar heat, when concentrated to the degree at which glass melts, does not render this oxide magnetic, provided it be protected by glass from the dust floating in the air; if not so protected, many of the particles become magnetic.

Mr. Lane then rubbed various portions of the oxide, in a glass mortar, with different combustible substances, namely, coal, sulphur, charcoal, camphor, ether, alcohol, &c., but found the oxide was not thereby rendered magnetic, without the assistance of a degree of heat equal to that of melting lead; with that degree, however, it became magnetic. Hydrogen, when aided by a red heat, had the same effect. Charcoal and cinders, well burnt, were found to require a longer continuance of the heat, to have their full effect on

the oxide, than dry wood, coal, or sulphur. A single grain of camphor, dissolved in an adequate portion of alcohol, was found sufficient, when assisted by a red heat, to render all the particles of 100 grains of the oxide magnetic. But such substances as are easily sublimed, will, by a continued application even of a low heat, quit the oxide, leaving it, as at first, unmagnetic. Hence we may understand why Prussian blue, sulphurets, and ores of iron, containing inflammable matter, become magnetic by the agency of heat, and revert to their unmagnetic state if the heat is continued long enough to drive off the inflammable matter.

The intention of this paper, Mr. Lane says, is to prove that mere oxides of iron are not magnetic; that inflammable substances do not render them magnetic until such substances are, by heat, chemically combined with them; and that when the combustible substance is again separated by heat, the oxides return to their unmagnetic state.

Additional Experiments and Remarks on an artificial Substance, which possesses the principal characteristic Properties of Tannin. By Charles Hatchett, Esq. F.R.S. Read June 27, 1805. [*Phil. Trans.* 1805, p. 285.]

Mr. Hatchett was, he says, at first inclined to consider the artificial tanning product as exactly similar to the natural vegetable principle called tannin; but as there appeared to be a considerable difference between them with respect to the effect of nitric acid (which acid produces the one while it destroys the other), he thought it necessary to make some experiments on the comparative effects of this acid on those substances which contain the largest proportions of tannin.

He accordingly subjected the artificial product, sometimes alone, and sometimes mixed with other substances, to the action of nitric acid; and although Mr. Hatchett cannot, he says, assert that this substance is absolutely indestructible when repeatedly distilled with that acid, yet the results of his experiments showed that the destruction of it, by that means, would be a work of considerable time and difficulty.

Muriatic acid also, appeared to have no effect on this substance; and Mr. Hatchett remarks, that the solutions of it seem to be completely imputrescible, also, that they do not become mouldy, like the infusions of galls, sumach, &c.

Some comparative experiments were then made, by means of nitric acid, on galls, sumach, Pegu cutch, kascutti; common cutch, and oak-bark; from which it appeared, that although the artificial product is by much the most indestructible of all the tanning substances, yet there is some difference in that respect between the various kinds of natural tannin; common cutch and the tannin of oak-bark resisting the effects of nitric acid much more than galls, sumach, kascutti, and Pegu cutch.

A number of miscellaneous experiments on the substance here